APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/625,406	07/23/2003	G. Lawrence Krablin	TN129	9074

7590 04/09/2007	EXAMINER
UNISYS Corporation Unisys Way, MS/E8-114 Blue Bell, PA 19424-0001	FRANCIS, MARK P

	ART UNIT	PAPER NUMBER
	2193	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/09/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>23 July 2003</u>.

2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-39</u> is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-39</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>23 July 2003</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☐ All   b)☐ Some * c)☐ None of:

         1.☐ Certified copies of the priority documents have been received.

         2.☐ Certified copies of the priority documents have been received in Application No. _____.

         3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
     Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1.   This action is responsive to the application filed on July 23, 2003.

2.   Claims 1-39 have been examined.

Oath/Declaration

3.   The Office acknowledges receipt of a properly signed oath/declaration filed July

23, 2003.

Claim Rejections - 35 USC § 102

4.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the

rejections under this section made in this Office action:

5.   A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by
another filed in the United States before the invention by the applicant for patent or (2) a patent
granted on an application for patent by another filed in the United States before the invention by the
applicant for patent, except that an international application filed under the treaty defined in section
351(a) shall have the effects for purposes of this subsection of an application filed in the United States
only if the international application designated the United States and was published under Article 21(2)
of such treaty in the English language.

6.   Claims 1-39 are rejected under 35 U.S.C. 102(e) as being anticipated by

Srivastava. (U.S. Pat 5,539,907)

Independent claims

With respect to claims 1,14, and 27, Srivastava discloses a translator (e.g. See Fig. 3,

element 51 Translator and related text) operating on a processor for translating

compiled programming code from a first code state to a second code state,9Col 4:12-

26, "...A compiler translates the high-level language of the program to object code...")

the programming code in the first code state comprising a plurality of basic blocks, (Col

3:55-67, "...the procedures including basic blocks...")each basic block comprising a set

of instructions,(Col 3:55-62, "...the basic blocks including instructions...") at least one

basic block ending in a dynamic branch,(Col 4:1-10, "...by monitoring conditional branch

instructions at the end of basic blocks...") the dynamic branch being a transfer to one of

a set of destinations based on a calculation of a destination address, (Col 5:25-35,

"...addressing schemes...")the translator: identifying the plurality of basic blocks in the

first code state of the programming code; (Col 6:1-15, "...The basic blocks..")

identifying links between the identified basic blocks; (Col 5:35-45, "...converts the

program into a linked module...")

constructing a control flow graph I representation (CFG) of the programming code

based on the identified basic blocks and identified links, the CFG being

in a preliminary form; (Col 6:35-45, "...create the control graphs...", Col 7:55-64,

"...procedure flow graph...")

identifying at least one basic block ending in a dynamic branch; (Col 11:14-20, "...a user

instrumentation routine branch...")

exploring, based on the CFG, (Col 6:35-45, "...create the control flow graphs...")all

identified basic blocks that lead to the dynamic branch as far back as is necessary to

fully determine a set of destination addresses for the dynamic branch, the set of

destination addresses defining the set of destinations from the dynamic branch; (Col

6:35-53, "...reveals all possible execution destinations...")

examining the set of destinations to identify a branch table; (Col 6:25-40, "...The jump

table...a set of branch tables...")

updating the CFG to reflect the set of destinations and the identified branch table; (Col

6:25-40, "...The jump table..a set of branch tables...")

translating the programming code from the first code state to the second code state

based at least in part on the updated CFG. (Col 5:37-50, "...The translator converts the

program into a linked module...")

Dependent claims

With respect to claims 2,15, and 28, the rejection of claims 1,14, and 27 are

incorporated respectively and further, Srivastava discloses that the exploring step

comprises the steps of for each explored basic block, constructing a corresponding

code graph / representation (code graph) of the instructions in such basic block; (Col

7:55-67, "...procedure flow graph...")and traversing each code graph to determine the

set of destination addresses from the dynamic branch.(Col 6:35-41, "...reveals all

possible execution destinations...")

With respect to claims 3,16, and 29, the rejection of claims 2,15, and 28 are

incorporated respectively and further, Srivastava discloses that each code graph is a

rooted directed acyclic graph having interconnected nodes, (Col 5:9-25, "...a program

call graph...") each node being one of an instruction node representing an instruction in

the corresponding basic block; (Col 3:55-67, "...the basic blocks including

instructions...")

an argument node representing an argument in the corresponding basic block;

an apply node edging to an instruction node and to an argument node and representing

the application of such argument node to such instruction -node, the apply node in

certain instances also being an argument node edged to by another node; (Col 6:25-40,

"...The jump table...a set of branch tables...")

a stack node edging to a pair of argument nodes and acting as an argument node

having the pair of argument nodes; (Col 7:55-67, "...procedure flow graph...")

a missing argument node representing a missing argument supplied from a different

basic block; (Col 5:37-50, "...The translator converts the program into a linked

module...")

and an alias node edged to by a stack node or apply node and edging to an argument

remote from such stack node, and representing such remote argument to such stack

node. (Col 7:55-67, "...procedure flow graph...")

With respect to claims 4,17, and 30, the rejection of claims 3,16, and 29 are

incorporated respectively and further, Srivastava discloses that the exploring step

comprises the steps of noting that a first code graph corresponding to a first basic block

contains a missing / insufficiently defined argument node; (Col 7:55-67, "...procedure

flow graph...")

locating, based on the CFG, a second basic block that immediately precedes the first

basic block, a second code graph corresponding to the second basic block; (Col 7:55-

67, "...procedure flow graph...")

constructing a new code graph having the first code graph and the second code graph

by replacing the missing argument node in the first code graph with the second code

graph; (Col 7:55-67, "...procedure flow graph...")

and traversing the new code graph in an effort to determine the set of destination

addresses from the dynamic branch.(Col 6:24-45, "...The address of the jump table can

be obtained...")

With respect to claims 5,18, and 31, the rejection of claims 4,17, and 30 are

incorporated respectively and further, Srivastava discloses that the exploring step

comprises the steps of locating, in the portion of the new code graph corresponding to

the second code graph, (Col 7:55-67, "...procedure flow graph...")

an instruction node representing a condition that must be satisfied to allow program flow

to continue from the second basic block to the first basic block; (Col 6:24-45, "...The

address of the jump table can be obtained...")

and replacing the located instruction node with a test node indicative of the condition

that must be satisfied. (Col 5:37-50, "...The translator converts the program into a linked

module...")

With respect to claims 6,19, and 32, the rejection of claims 5,17, and 30 are

incorporated respectively and further, Srivastava discloses that the located instruction

node is representative of a branch instruction, (Col 11:14-30, "...routine BRANCH...")

and the condition that must be satisfied is a logical true, a logical false, or a pre-

determined index value.(Col 6:30-40, "...the case index value...")

With respect to claims 7,20, and 33, the rejection of claims 5,18, and 31 are

incorporated respectively and further, Srivastava discloses that the exploring step

comprises the step of performing bounds evaluation according to a list of props, each

prop indicating a target node to which such prop applies and a set of bounds that are to

be applied to such node.(Col 7:55-67, '...the interfaces or edges...")

With respect to claims 8,21, and 34, the rejection of claims 7,20, and 33 are

incorporated respectively and further, Srivastava discloses that the step of performing

bounds evaluation comprises the step of traversing each node in the code graph for

each prop in the list. (Col 7:55-67, '...the interfaces or edges...")

With respect to claims 9,22, and 35, the rejection of claims 8,21, and 34 are

incorporated respectively and further, Srivastava discloses that the step of traversing

each node comprises, for each prop, the step of attempting to push bounds information

into the argument node edged to from an apply node if such apply node is being

traversed and is the target node of the prop. (Col 7:55-67, '...the interfaces or edges...")

With respect to claims 10,23, and 36, the rejection of claims 9,22, and 35 are

incorporated respectively and further, Srivastava discloses that each node includes

bounds information, (Col 7:55-67, "...procedure flow graph...")and wherein the

attempting step comprises the steps of attempting to deduce bounds information for the

argument node edged to from the target apply node based on such argument node and

the instruction node edged to from such target apply node; (Col 11:14-30, "...routine

BRANCH...") if appropriate, altering the bounds information of the argument node

edged to from the target apply node; (Col 7:55-67, "...procedure flow graph...")

and adding a new prop to the list if the bounds information of the argument node edged

to from the target apply node is altered. (Col 5:37-50, "...The translator converts the

program into a linked module...")

With respect to claims 11,24, and 37, the rejection of claims 7,20, and 33 are

incorporated respectively and further, Srivastava discloses that the step of traversing

each node comprises creating a prop for the argument of each test node the first time

the test node is encountered. (Col 5:37-50, "...The translator converts the program into

a linked module...")

With respect to claims 12,25, and 38, the rejection of claims 11,24, and 35 are

incorporated respectively and further, Srivastava discloses that the step of traversing

each node comprises preliminarily traversing the code graph with an empty prop the

purpose of accumulating props for test nodes. (Col 6:24-45, "...The address of the jump table can be obtained...")

With respect to claims 13,26, and 39, the rejection of claims 12,25, and 38 are incorporated respectively and further, Srivastava discloses that each node includes bounds information, (Col 7:55-67, '...the interfaces or edges...")
and wherein the step of traversing each node comprises stepping through the code graph in a spanning direction, (Col 6:35-41, "...reveals all possible execution destinations...") and then re-tracing through the code graph opposite the spanning direction, the re-tracing step including the step of re-evaluating the bounds information of each re-traced node whenever a change in bounds may result. Col 6:24-45, "...The address of the jump table can be obtained...")

Conclusion

7.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

8.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark P. Francis whose telephone number is (571)272-7956. The examiner can normally be reached on Mon-Fri 8:00-4:30.

    If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai T.An can be reached on (571)272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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